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ABSTRACT

A clinical approach to teacher education used at the University of Illinois is described. It is characterized by the following: (1) a broad basis for providing input (using ideas of inservice teachers, professors, and undergraduate students); (2) continuity of professional education (involving inservice teachers in seminars); (3) team approach to professional education (seminars involving those referred to in (1) above, and the student teacher is not an apprentice but an active member of the team); (4) variety of experiences (elementary through senior high school and low-achieving to advanced classes); (5) individualized training (flexible assignments and responsibilities for students); and (6) "mini-teaching" (two or three teachers to a group of five or six students). One semester is devoted to the program having the above qualities. Appendices include discussion of mini-teaching, objectives, and conditions. (JG)

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SCHOOL-UNIVERSITY COOPERATION: A SEARCH FOR NEW STRUCTURES IN TEACHER EDUCATION*

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*A paper presented at the 1971 annual meeting of the National Council of Teachers of Mathematics, Anaheim, California (Revised, October 1971).

SCHOOL-UNIVERSITY COOPERATION: A SEARCH FOR NEW STRUCTURES IN TEACHER EDUCATION

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I. The changing scene in teacher education. The winds of change continue to blow on education, and within the past few years have been pummelling teaching and teacher education with increasive force. The technological revolution, with its cassettes, computers, and closed-circuit TV, together with the growing popularity of performance contracting and accountability, provided much of the impact of the initial onslaught. The teacher surplus accelerated the movement to near gale-force intensity. However, the storm clouds on the horizon of teacher education need be no cause for alarm. On the contrary, they might be occasion for rejoicing. For example, in the absence of pressures for producing large numbers of candidates for school districts with seemingly insatiable and relatively unselective appetites, colleges of education now have the opportunity to do research and development. Instead of investing most of their resources in service, they can now devote significant time and effort to the design and implementation of alternatives in teacher education.

It is invigorating to contemplate the prospect of centers for teacher education in various parts of the country which have carved out for themselves areas of intensive, scholarly investigation of major aspects of teacher education. With a little imagination the embryo of such an idea can already be delineated. The work on microteaching initiated by Allen, et al., at Stanford has provided the profession with a training tool whose potential is only now being realized. Flanders and his associates at the University of Michigan have developed an ingenious system for describing and analyzing teacher-pupil verbal interaction. Galloway at Ohio State has devised a procedure for training teachers for becoming more knowledgeable of nonverbal interchanges in the classroom, a dimension of teaching which may be far more critical in effective communication than is the verbal component. B. O. Smith, now at the University of South Florida, is pursuing his concerns for training in pedagogic skills within the framework of a separate institute of education. And this rather impressive list can readily be extended.

Now what appears to be needed is a programmatic approach to problems of teacher education, at least to the extent that at some "higher" level, attention is paid to ongoing efforts, and assessment is made of the extent to which major concerns of mathematics teacher educators are being tackled. At the very least, summaries of major ongoing efforts, with indications of target areas not yet being studied, might stimulate attention to pressing problems. Perhaps this is an area to which NCTM might address itself.

II. A clinical approach to teacher education (or, is teacher education too important to be left to the teacher educators?). At the University of Illinois, we have been concerned with the notion of clinical training. The proposal is that we might approach teacher education in a manner espoused by some of the more imaginative medical educators. I refer particularly to the work of John H. Knowles of the Massachusetts General Hospital whose study of the evolution of the teaching hospital led to many specific recommendations for the improvement of medical education. I also rely heavily upon a review of Knowles' book by Arthur S. Bolster, in which he spelled out inferences of the work of teacher education. We are attempting to develop a model for teacher

education, therefore, which includes a substantial clinical component. By clinical component I mean that element of training which is problem centered and gives training in solving these problems within the context of actual teaching situations.

Following directly from the notion of clinical training is the requirement that a college of education have direct, functional and truly cooperative relationships with school systems. That is, colleges of education are to relate to schools as vital parts of a training system, and, concurrently, schools view their work in teacher education as a legitimate commitment rather than a requirement supplementary to their regular instructional responsibilities. The experimental teacher education program is characterized as follows:

A. A broad basis for providing input and delegating responsibility. We are committed to the notion of genuine cooperation with the schools in the design and conduct of professional education preparatory programs. Two main justifications for this are cited:

   1. Competence. Most schools can muster an impressive array of well-qualified people, both in terms of formal training and successful on-the-job performance. This is particularly true if a number of schools can pool their manpower resources.

   2. Credibility. Master teachers in the schools can bring with them, to teacher education, an aura of freshness, of an awareness stemming from experience. They tend to be attended and referred to with more confidence than are university personnel who, in the eyes of the college students, at least, are far removed from the action and hence, from reality and relevance. Also, clinical input enhances the credibility of the program in the minds of other school faculty and administration. The program is "of them" reflecting the best efforts of "their own" colleagues.

B. Continuity of professional education. No professional is ever fully educated. Yet, teaching has historically been a profession characterized by an enormous chasm between the status of uncertificated and certificated personnel. While the empirical justification for this distinction has never been clear, the facts are that little in the way of responsibility or prerogative typically is granted the student teacher. But a few short months later, once paper qualifications are in hand, quite staggering and momentous decision-making power and responsibility are rather freely bestowed upon the same individual. The present project attempts to bridge this gap between pre- and postcertification. The teachers in training, who are college seniors with majors in mathematics, become involved to a great extent in the ongoing instructional process at the school. Well-defined instructional sequences are assigned to the trainees, to be carried on a sustained basis for up to eight or ten weeks. Full responsibility for preparation, instruction, testing, and grading are handed over to the candidates. And the student teacher is not held responsible to an individual teacher or supervisor, but the the department and in particular to a teacher education team within that department. Similarly, beginning teachers are not left to shift for themselves, but they, too, may be members of the professional team. These certificated teachers, as they concern themselves about problems of instruction and curriculum, are expected to bring questions and problems as well as suggestions and activities to periodic seminars of the teacher education team.

C. A team approach to professional education. The problems of teaching are so complex that the expertise of any one person is not likely to be sufficient to fully meet the demands of day-to-day problem situations. More satisfactory is the approach to problem solving which calls upon the combined resources of a variety of persons and backgrounds. Seminars are held on a regular basis in which an experienced teacher joins forces with a teacher educator from the university in deliberating upon the selection of teaching strategies, the examination of the logic of an observed proof or the discussion of the handling of a disruptive classroom incident. In the latter case the expertise of an educational psychologist is also likely to be valuable input. Student teachers and, when possible, second- or third-year teacher education students, may also be members of the professional team, and while they typically will be drawing upon the resources of that group, at other times they will contribute greatly to the content and quality of the dialogue.

A further characteristic of the team approach to teacher education is that it abandons the apprenticeship view of training. Teaching is becoming an ever more complex and sophisticated profession and as the demands of an increasingly complex society for quality education continue to mount, the demands upon the teacher accelerate wildly. Student teaching must, therefore, be more than an apprenticeship. In an apprenticeship, such as barbering, the student's task is to imitate to the best of his ability the technique of the master barber. There undoubtedly do exist such master barbers who know essentially all there is to know about barbering, and who serve as excellent models of craftsmanship (although with the current interest in hairstyling for men, the barbering profession is facing its own increased problems for training, I suspect). But I do not believe such master teachers exist.

Student teaching must consist of much more than mere imitation of a selected master teacher. There must be analysis, interpretation, and discussion of instructional strategies. There must be trial, ceaseless trial. There must be, perhaps most important of all, some overall structure to the teaching task, a search for general principles which can be applied in day-to-day planning, instruction and evaluation. The present teacher education project proposes that the attainment of such a goal can be greatly assisted through the judicious and deliberate use of seminars conducted within the professional team structure.

D. Variety of educational experiences. A by-product of the apprenticeship model for student teaching, wherein one student teacher is primarily assigned to one supervising teacher, is that the classroom experiences tend to be limited to the subject and grade level assigned to that particular supervising teacher. The present project is designed to provide the student teacher with a broad spectrum of teaching experiences--from elementary school through senior high school (and for some, into junior college) and from low-achieving to advanced classes. An even more desirable feature would be to offer experience in schools located in a variety of cultural and socio-economic environments.

E. Individualized training. In typical student teaching programs, all trainees are subjected to essentially the same instructional treatment. In the present program, however, deliberate attempts are made to suit the training experience to the interests and needs of the candidates. Some student teachers exhibit a great deal of confidence and insight, and are ready to assume considerable responsibility early in the program. Others appear to

profit from more supportive classes and to more intensive supervision. The opportunity to choose courses and classes is also important to some student teachers. In particular, the teaching of sophomore geometry for student teachers who enter a school during the second semester often poses a threatening situation. For many, there has been virtually no contact with the "classical" Euclidean problems since the student teachers themselves were in high school. This is not to say, of course, that the teaching of geometry should be avoided. On the contrary, extra emphasis on that area during student teaching is probably desirable. But initial teaching contacts undoubtedly should be in areas where the candidate feels more at ease with the subject matter and with the instructional setting.

F. Team teaching in a small group situation or "mini teaching." An important feature of the first few weeks of the training program is small group instruction called "mini teaching." Details concerning this technique are available in Appendix A. The essential features of the procedure, however, include the assignment of teams of student teachers (say, two or three candidates) to the teaching of small groups of students (say, five or six persons). This team of student teachers is responsible for the sustained instruction of their small group for a period of three or four weeks. The team jointly plans the lessons, teaches the group (and here there is ample opportunity for genuine teamwork as the student teachers assist each other, help to clarify points, do individual tutoring, and so on) and then discusses the teaching. When possible, videotaping of the mini teaching is also done, and serves as a basis for further discussion of the sessions. The regular classroom teacher, the resource teacher for the school, the college teacher and doctoral students in teacher education all are available for observation of classes, leading discussions concerning the teaching, giving demonstration lessons and assisting in future planning.

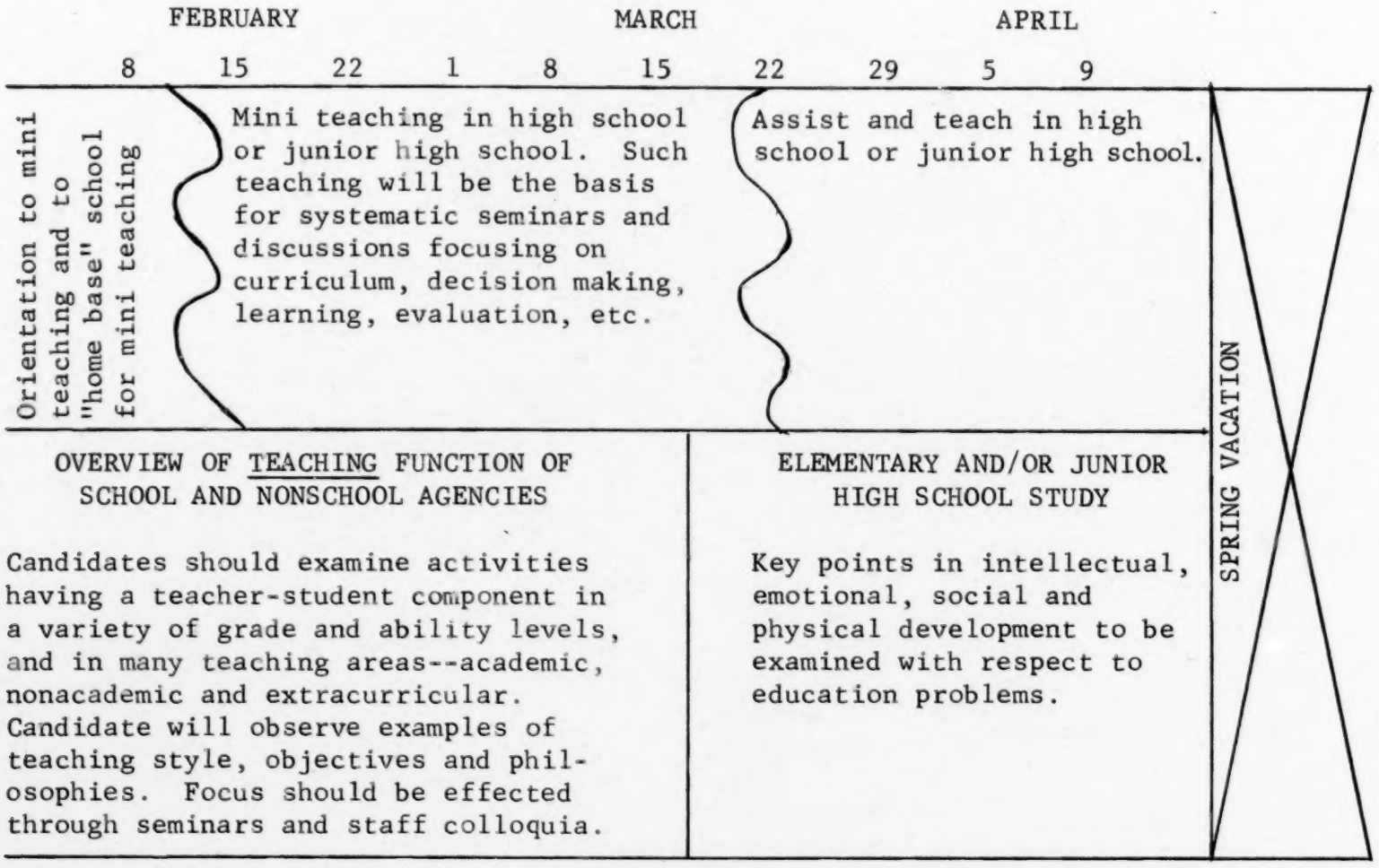
Potential benefits of the mini teaching are many. The scaled down teaching encounter minimizes many anxieties concerning "going it alone" in a large class. Since the numbers are so small, the student teacher comes to know each student very well, and becomes accustomed to thinking of students as individuals. Furthermore, the tendency to lecture, which is all too common with beginning teachers (a tendency which is natural enough, since imitation of many years of teaching is a powerful instructor) is easier to resist. Somehow, lecturing a class of four or five students who are sitting around in a circle does not quite fit the bill! Finally, the teamwork in presenting a topic, engaging in a discussion concerning questions raised by the students, providing alternative points of view, clarifying issues raised, and so on, appears to be valuable training ground for classes of the future where team teaching is likely to be increasingly common.

II. The professional semester. The training program for the teaching candidates comprises 16 weeks of experiences conducted entirely "on location" in Township High School District 214, a network of high schools in northwest suburban Chicago. Figure 1 indicates the sequence of activities for the semester.

Figure 2 outlines in more detail the activities for the student teachers for the first three weeks. As Figure 2 indicates, the mornings are devoted primarily to one class of mini teaching and to related activities (planning, discussion, observation). During the afternoons, considerable time is spent on observation of other classes in the mathematics department, other teaching areas

FLOW CHART FOR DISTRICT 214-25, UNIVERSITY OF ILLINOIS

Multiple school plus community experiences for each candidate. Seminars and colloquia may be in central location.


FEBRUARY
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Orientation to mini teaching and to "home base" school for mini teaching
Mini teaching in high school or junior high school. Such teaching will be the basis for systematic seminars and discussions focusing on curriculum, decision making, learning, evaluation, etc.
Assist and teach in high school or junior high school.
SPRING VACATION
OVERVIEW OF TEACHING FUNCTION OF SCHOOL AND NONSCHOOL AGENCIES
Candidates should examine activities having a teacher-student component in a variety of grade and ability levels, and in many teaching areas--academic, nonacademic and extracurricular. Candidate will observe examples of teaching style, objectives and philosophies. Focus should be effected through seminars and staff colloquia.
ELEMENTARY AND/OR JUNIOR HIGH SCHOOL STUDY
Key points in intellectual, emotional, social and physical development to be examined with respect to education problems.

Figure 1

TEACHER EDUCATION PROJECT, SPRING 1971

Single school plus community experiences for each candidate. Seminars and colloquia may be in central location.

APRIL				MAY			JUNE	
19	26	3	10	17	24	31	7	11

SUSTAINED CLASSROOM TEACHING

Student assigned to <u>department</u> with supervision by one or more teachers. Options should remain open for candidate to work with a variety of programs, grade and ability levels, and teachers.

SYSTEMATIZED INVOLVEMENT IN SUPPORTIVE AND SUPPLEMENTAL PROGRAMS

E.g., community experiences with social agencies, business and industry, adult education, etc.
Pupil personnel
Central administration, e.g., finance, planning, public relations
Extracurricular
Special education
Staff development
Professional negotiations

The issues, challenges and problems raised by these involvements should be examined through seminars and staff colloquia.

Candidate should select at least one area for sustained work.

While a candidate should be assured time and opportunity to work with school programs other than subject-oriented classroom teaching, he should also have a portion of his experience focused almost totally on a single kind of job description, e.g., classroom teacher.

One school experience for candidate

Evaluation of program, offerings, and candidates should be a continual and ongoing component of this project. The evaluation process should function in the guidance of candidates and the alteration of the direction and offering.

February

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	8	9	10	11	12	13
a.m.	Mini teaching one class each morning at Forest View High School and at Elk Grove High School. Those at Forest View High School will attend computer mathematics class for the entire three weeks during second period.					
p.m.	All student teachers and cooperating teachers meet at Prospect High School at 1:00 p.m.	Arlington High School algebra	Forest View High School to learn use of A. V. equipment	Arlington High School algebra		
	15	16	17	18	19	20
a.m.	Mini teaching one class each morning at Forest View High School and at Elk Grove High School. Those at Forest View High School will attend computer mathematics class for the entire three weeks during second period. (One period each morning will be used to discuss the mini teaching experiences that day.)					
p.m.	Elk Grove--routine duties Lecture	Arlington High School algebra	Visit Instruction Resources Center	Arlington High School algebra	Chicago Men's Mathematics Club, 5:30 p.m.	
	22	23	24	25	26	27
a.m.	Mini teaching one class each morning at Forest View High School and at Elk Grove High School. Those at Forest View High School will attend computer mathematics class for the entire three weeks during second period.			Two full days at Wheeling High School		
p.m.	Testing and grading lecture at Elk Grove	Arlington High School algebra	Ethics and professional organizations lecture			

Figure 2.--Schedule for First Three Weeks of Professional Semester

and in other schools (including elementary and junior high schools). Other afternoon activities include seminars, observation and lectures involving techniques and strategies.

As Figure 2 further indicates, the entire group of student teachers will spend two full days in a school which employs modular scheduling (see Appendix B). During the first day, each student teacher will "shadow" a high school student to gain some insight concerning the experience of students in schools using this administrative procedure. Other training opportunities, as indicated in Appendix B, are planned for the second day.

Throughout the semester, other schools have planned other training experiences for the student teachers. Appendix C indicates some activities prepared by another school to assist the candidates in working with general mathematics classes. The remainder of the semester is devoted to more sustained teaching in the schools. Student teachers work within departments, assuming more and more responsibility for the progress of selected classes.

IV. Concluding remarks. Teaching is essentially a conservative enterprise. Most data seem to indicate that we teach essentially the way we have been taught, and our students, perpetuating the cycle, will teach using our behavior for models. From whence, therefore, will the new breed of teachers needed for tomorrow's schools come?

Although it would be folly to make statements at this early date concerning the payoff of the present project in terms of changing teacher behavior, indications at present are promising.

The project has, it appears, done much to bridge the credibility gap between schools and teacher education colleges. Public school people are providing a great deal of the input for the program, much of it coming through the channel of in-service teacher education. It would appear inevitable, for example, that as practicing teachers consider seriously the many issues dealing with the instruction of general mathematics classes and prepare appropriate training experiences of student teachers, that they themselves will go about their duties in a more effective manner.

Clinical training is, undoubtedly, but one facet of the many-sided tasks of teacher preparation. But it appears to provide a rich variety of opportunities for improving this vital aspect of education.

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APPENDIX A

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

John E. Erickson, University of Illinois, Urbana

Mini Teaching

In this experience the candidate is required to conduct a series of lessons with a small group of students (five or six) without the additional burden of making curricular decisions concerning the content or goal of those lessons.

The supervising teacher would group the students in a class to provide mini classes of five or six students each. Each of the resulting mini classes would become the assigned responsibility of a candidate. As an example, a class of 25 students could be formed into four or five mini classes. Each mini class would be conducted by one of four or five candidates. The supervising teacher would have the responsibility of discussing with the candidates the goal of a series of lessons which each candidate would attempt to reach in his mini class. All of the mini classes would attempt to reach the same goal and, insofar as possible, would use the same materials. The supervising teacher would observe the work of the candidates and discuss with them the development of their lessons.

Desired Outcomes of Coordinated and Supervised Small Group Teaching

1. During the experience of mini teaching, the candidate should discover how to acknowledge and build on the individual characteristics of his five or six students, whether the students represent a wide array of readiness and talent for the goals of the lessons or a narrow, homogeneous array. Each student's success at achieving the goals of the lesson requires attention to the behavior of each student. Often, when a teacher faces a classroom of 20 or more students, the progress of each student becomes confusingly difficult to follow, and if it becomes apparent that some have not progressed well enough, it becomes very difficult to retrace the lessons without impeding the progress of those who are ahead.

2. Mini teaching provides the candidate the opportunity to directly compare his progress at reaching the common goals with that of his fellow candidates. An outcome of this experience would be the development of the capacity to accept and understand the value of such comparisons and to accept the responsibility of modifying his teaching behavior in the light of suggestions made or of examples revealed and to do so in the spirit of professional inquiry, keeping in mind that the student's progress is the prime objective of the teacher.

3. Because the candidate will be working with ideas and materials other than those devised by himself and because he will be working closely with his fellow candidates, he will have a unique opportunity to reflect a tolerant and cooperative image. It is to be desired that the candidate show himself to be receptive to and reflective of the ideas of other professionals and that he demonstrate a willingness to aid his colleagues in their attempts and to receive aid in turn. A closed mind and a narrow tolerance for the ways of other professionals is unlikely to nurture open-mindedness in young people.

4. It is to be expected that the candidate will discover more about his students than how they perform in his class. He should show ability to relate the goal of the lessons to the person of each student.

5. Later, in each student's relationships with other larger classes, it is hoped that he will attempt to produce a small group procedure with a large group setting.

Conditions

1. Staff. A teacher volunteering to be a coordinating supervisor of this experience needs to be capable of working with a team of candidates providing direction, supervision, and criticism of the candidates' progress. The teacher needs to be capable of promoting group discussion and interaction. He needs to have the confidence of his candidates who will seek to implement goals developed by the teacher. He should be a person who inspires confidence and provides security for those with whom he works. Since mini teaching will promote comparisons of teaching effectiveness thereby raising anxiety and frustration in some candidates, the teacher must be one who is perceived as more interested in the growth of each candidate than in comparing one with another.

2. Curriculum. The curriculum for this experience must be stable enough to assure that recognizable goals for pupil learning can be expressed. It should be of a duration sufficiently long (three or four weeks) to allow each of the candidates an opportunity for growth. It should be structured to allow for the assessment of pupil learning more than once during the experience.

3. Physical plant. Situations selected for mini teaching should be planned for schools or times of day which allow for the division of a class into four, five, or six teaching groups each with sufficient room, equipment, and privacy to give the candidates an equal opportunity to pursue the goals of the lessons.

4. Orientation and consultation opportunities. Arrangements need to be made to secure sufficient time to orient the candidates to the teaching tasks and facilities prior to their involvement in the mini teaching. During the experience itself time must be provided to be used in consultation with the candidates and for briefings for the succeeding lessons. A fair estimate of the orientation period might be three-period days. At least three periods per week would be required to provide briefing and discussion. This time period should be within the half day in which the mini-teaching period takes place.

5. Reporting procedures. During the mini-teaching experience the candidate will be responsible for collecting a syllabus describing the curricular goals, strategies, and materials used. Following each lesson the candidate is responsible for appending to his daily plan an evaluation of his performance and suggestions for changes in procedures or materials. This log of activities and reflections will be used in discussions of teaching effectiveness and will be available to the coordinating supervisor for examination and comment. It will also be available to allied university and public school staff and, of course, may be made available to any others the candidate wishes. The log or a copy of it, provided by the student, will become a part of the candidate's record.

The coordinating supervisor is responsible for keeping a weekly appraisal of the candidate's performance. This appraisal will be open to examination and comment by the candidate and allied university and public school personnel and will become a part of the candidate's record.

At the termination of this experience, an evaluation committee comprising the coordinating supervisor, a university supervisor, and the candidate will meet to discuss the candidate's development and make any such recommendations as are appropriate. A report of this meeting written by the university supervisor will become a part of the candidate's record.

All records should be kept on 8½ x 11 sized lined or unlined paper.

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

Report Forms

Attached are sample copies of evaluation forms for the "mini-teaching" experience. The forms can be supplied upon request of John E. Erickson, 384 Education Building, University of Illinois, or Al Snap, Administration Center, 799 West Kensington Road, Mt. Prospect.

CSSGT: A

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

Candidate Report Form

General Data

(Candidate's name) (Coordinator's name) (School)

(Name of course) (Number of students) (Time and days course meets)

(Time and place of staff consultation sessions) (Meeting place of candidate's group)

General description of the nature, goals, and materials pertinent to all of the "mini-teaching" groups formed of the course designated.

CSSGT: A.1

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

Candidate Report Form

Daily Report

(Candidate's name) _____ (Date) _____

I. Statement of purpose for today's activity:

II. Description of today's activity:

III. Evaluation of activity's success in terms of stated purpose:

IV. Evaluation of candidate's success as teacher or facilitator:

V. Ideas for improving upon today's session:

VI. Insights into the students' capabilities and personal behavior:

CSSGT: B

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

Coordinator's Weekly Report

(Candidate's name)	(Coordinator's name)	(Date)

I. Evaluation of candidate's ability to form a healthy working relationship with his/her students:

II. Evaluation of candidate's ability to plan the day-to-day activities; including arranging materials, time, and other resources:

III. Evaluation of candidate's success in reaching desired goals:

IV. Suggestions made to the candidate to strengthen the candidate's interaction with his/her students.

CSSGT: C

COORDINATED AND SUPERVISED SMALL GROUP TEACHING

Evaluation Committee Report Form

(Candidate's name)	(Coordinator's name)	(University supervisor)	(Date)

I. General estimate of the candidate's performance in reaching assigned goals:

II. Recommendation of the committee regarding the candidate's completion of the mini-teaching component in teacher education.

III. Committee recommendations (if any) regarding the candidate's continuation in the mini-teaching component:

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JEE:psh

APPENDIX B

STUDENT TEACHING UNDER MODULAR SCHEDULING

Prepared by the staff at Wheeling High School

Student teaching is a learning experience. Any present teacher would strongly agree with that statement. At Wheeling High School we feel there is an opportunity for much more learning to take place--more learning experiences for students, for student teachers, and for master teachers as well. This is made possible by the advent of modular scheduling.

We have used modular scheduling to vary class sizes, class meeting time, and teaching and learning activities. It has made it possible for use to develop team teaching, individualized instruction, increased student responsibility, and the possibility of experimenting with almost every conceivable type of teaching and learning activity. This is the great advantage of modular scheduling. The opportunity for innovation, for experimentation, for testing and trying different techniques, for observation, and for widening your experience is vastly increased. Other schools may be trying one or two innovations, but do not have time or the opportunity for others. Here at Wheeling new ideas and methods are being tried by every teacher in every subject.

Opportunities are great, but we, by no means, have a perfect world. As teachers, we are working harder than we have ever worked before. Increased student responsibility has presented us with increased student problems of discipline, class attendance, and use of unscheduled time. We do have an atmosphere ideal for learning and experimenting. This is why Wheeling High School is an ideal place for prospective teachers to come to observe and to join in on our experiences and problems. Practice teachers can learn right along with master teachers and share in our successes and our frustrations.

Here is a list of some of the experiences we feel are made available to prospective student teachers particularly through modular scheduling. This is by no means a complete list, but some of the more outstanding experiences possible.

1. Team teaching. The opportunity of planning and working with a group of fellow teachers; the problems of group dynamics and co-planning and doing found here are not present in the "ordinary" classroom; compromising and critiquing each other's efforts is an interesting experience indeed.

2. Large group instruction. Going all out to plan an elaborate lecture presentation that 150 students will hear at once; this can be a team or an individual effort.

3. Small group instruction. Techniques for teaching 10 to 12 students are much different from teaching 30; many different techniques can and should be tried.

4. Utilizing resource rooms. Here is one-to-one student-teacher relationship designed to meet a student's individual problems; each student's personality and difficulties must be dealt with in their own unique way.

5. Audio-tutorial techniques. Eventually lectures can be done away with; a student can see a video-tape of a lecture when he is ready for it.

6. Individual progression. A class of 15 students with each one progressing at his own rate; tapes and worksheets could be made available; how to grade a class of this type must be determined.

7. Enrichment activities. Students can come in on their unscheduled time for enrichment or remedial work; a student can take a subject of his own liking and be the only one taking it.

8. Objectives of teaching. Through workshops we have listed course objectives for each section of every chapter and have made them available to all students; these must be continually reevaluated.

9. Supervisory techniques. Increased student free time has increased the need for supervision of hallways, washrooms, cafeteria, student lounges, and resource areas; every rose stem has its thorns.

10. Redefining the role of a teacher. Teaching is not necessarily just lecturing and leading discussions; there are times when a teacher's role becomes that of resource person, director of learning, counselor, critic, guide to procedures, cooperator, supervisor, etc.; using varied techniques of teaching causes the teacher's role to vary.

11. Developing responsibility. With increased unscheduled time a student has increased responsibility; many students must be guided carefully to develop self-responsibility and self-discipline.

12. Observing other teaching. With decreased time in the classroom and through team teaching there is a greater possibility of observing and practicing different styles and methods of teaching large groups, small groups and individuals.

These are some of the experiences we feel any practice teacher, or any seasoned veteran, can become involved in through modular scheduling. Once again, these activities are not unique to Wheeling High School, but the opportunity for all of them is present. This is not the case under traditional scheduling. Any practice teacher willing to work and experiment is more than welcome to joing us at Wheeling and grow along with us.

APPENDIX C

TEACHING GENERAL MATHEMATICS

Prepared by the staff at Elk Grove High School

Outline

I. Evaluation of general mathematics class.
II. Evaluation of student.

- A. Take a test or tests and evaluate that test.
- B. Have student teacher make up the test.
- C. Analyzing results item-by-item grid.
- D. Use of test results for reteaching, grading, etc.
- E. How to grade a general math student.

III. Teaching techniques.
IV. Characteristics of general mathematics students.
V. Outline of a general mathematics course.
VI. Materials on general mathematics programs.

Evaluation of Students

I. Tests.

A. Construction of tests requires certain considerations.

1. Start out with questions anyone can answer.
2. Evaluate why the student missed the question.
3. Cover one concept on each question.
4. Length of test should be a maximum of 45 minutes.
5. Test often and cover shorter units.
6. The amount of reading should be limited.
7. Simple instructions should be used.

B. Students should pass or fail the test on his ability in the basic concepts of the unit although other items could and should be included in the evaluation.

C. An item-by-item grid for evaluation of each student and each question can be used.

1. As a guide for reteaching.
2. To evaluate the test.

II. Other things to be considered in evaluating the student.

- A. Attendance.
- B. Honest effort.
- C. Emphasis on homework.
- D. Classroom participation.
- E. Use of "G" grade.

III. What constitutes a failure?

Teaching Techniques

1. Use positive reinforcing experiences.
2. Use varied approaches so as to maintain peak interest.
3. Use of concrete materials with this type of student is necessary.
4. Use of multimedia is essential.
5. Prepare mathematical goals before start of year.
6. Prepare objectives for each unit.
7. Vary activities within period and the week. (Provide group and individual activities.)
8. Avoid lectures--use question-and-answer approach.
9. Be alert for misplaced students.
10. Accept and plan for individual differences of students.
11. Provide for immediate and continued success.
12. Provide for immediate feedback to student.
13. Work to establish an ideal rapport between student and teacher.
14. Avoid relying on text completely.
15. Provide for student involvement through group and individual activities.
16. Plan units which will capitalize on student's interests.
17. When reteaching, use a new and fresh approach.
18. Select materials appropriate to reading level, interest, etc.
19. Provide them with a realistic challenge.
20. Write assignments on the blackboard.
21. Remember to talk to the student, not the blackboard.
22. Write down on blackboard almost all of what is said.